McGRAW-HILL DICTIONARY OF SCIENTIFIC AND TECHNICAL TERMS

Sixth Edition

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On the cover: Representation of a fullerene molecule with a noble gas atom trapped inside. At the Permian-Triassic sedimentary boundary the noble gases helium and argon have been found trapped inside fullerenes. They exhibit isotope ratios quite similar to those found in meterorites, suggesting that a fireball meteorite or asteroid exploded when it hit the Earth, causing major changes in the environment. ***(Image copyright © Dr. Luann Becker. Reproduced with permission.)***

Over the six editions of the Dictionary, material has been drawn from the following references: G. M. Garrity et al., *Taxonomic Outline of the Procaryotes,* Release 2, Springer-Verlag, January 2002; D. W. Linzey, *Vertebrate Biology,* McGraw-Hill, 2001; J. A. Pechenik, *Biology of the Invertebrates,* 4th ed., McGraw-Hill, 2000; *U.S. Air Force Glossary of Standardized Terms,* AF Manual 11-1, vol. 1, 1972; F. Casey, ed., *Compilation of Terms in Information Sciences Technology,* Federal Council for Science and Technology, 1970; *Communications-Electronics Terminology,* AF Manual 11-1, vol. 3, 1970; P. W. Thrush, comp. and ed., *A Dictionary of Mining, Mineral, and Related Terms,* Bureau of Mines, 1968; *A DOD Glossary of Mapping, Charting and Geodetic Terms,* Department of Defense, 1967; J. M. Gilliland, *Solar-Terrestrial Physics: A Glossary of Terms and Abbreviations,* Royal Aircraft Establishment Technical Report 67158, 1967; W. H. Allen, ed., *Dictionary of Technical Terms for Aerospace Use,* National Aeronautics and Space Administration, 1965; *Glossary of Stinfo Terminology,* Office of Aerospace Research, U.S. Air Force, 1963; *Naval Dictionary of Electronic, Technical, and Imperative Terms,* Bureau of Naval Personnel, 1962; R. E. Huschke, *Glossary of Meteorology,* American Meteorological Society, 1959; *ADP Glossary,* Department of the Navy, NAVSO P-3097; *Glossary of Air Traffic Control Terms,* Federal Aviation Agency; *A Glossary of Range Terminology, White Sands Missile Range, New Mexico,* National Bureau of Standards, AD 467-424; *Nuclear Terms: A Glossary,* 2d ed., Atomic Energy Commission.

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includes the traditional chemical, petroleum, and petrochemical industries. { ¦kem·i·kəl 'prä·səs ¸in·də·strē }

chemical pulp [MATER] Wood pulp made by separating the fibers of wood chips by the action of alkalies or acids. { 'kem·i·kəl 'pəlp }

chemical pulping [CHEM ENG] Separation of wood fiber for paper pulp by chemical treatment of wood chips to dissolve the lignin that cements the fibers together. { 'kem·i·kəl 'pəlp·iŋ }

chemical pump [PETRO ENG] Skid-mounted pumping unit used to feed chemicals into the power oil (used to operate bottom-hole pumps in oil wells) to reduce corrosion in the system and to assist in water removal when the power oil and well-produced oil reach the ground-level wash tank. { 'kem·i·kəl ¦pəmp }

chemical purity *See* purity. { 'kem·ə·kə 'pyůr·ə·dē }

chemical reaction [CHEM] A change in which a substance (or substances) is changed into one or more new substances; there is only a minute change, Δm, in the mass of the system, given by $\Delta E = \Delta mc^2$, where ΔE is the energy emitted or absorbed and c is the speed of light. { 'kem·i·kəl rē'ak·shən }

chemical reactivity [CHEM] The tendency of two or more chemicals to react to form one or more products differing from the reactants. { 'kem·i·kəl rē¸ak'tiv·əd·ē }

chemical reactor [CHEM ENG] Vessel, tube, pipe, or other container within which a chemical reaction is made to take place; may be batch or continuous, open or packed, and can use thermal, catalytic, or irradiation actuation. { 'kem·i·kəl rē'ak·tər }

chemical relaxation [CHEM] The readjustment of a chemical system to a new equilibrium after the equilibrium of a chemical reaction is disturbed by a sudden change, particularly in an external parameter such as pressure or temperature. { 'kem·ə·kəl ¸rē¸lak'sā·shən }

chemical remanent magnetization [GEOPHYS] Permanent magnetization of rocks acquired when a magnetic material, such as hematite, is grown at low temperature through the oxidation of some other iron mineral, such as magnetite or goethite; the growing mineral becomes magnetized in the direction of any field which is present. Abbreviated CRM. { 'kem·i·kəl 'rem·ə·nənt ¸mag·nət·ə'zā·shən }

chemical reservoir [GEOL] An underground oil or gas trap formed in limestones or dolomites deposited in quiescent geologic environments. { 'kem·i·kəl 'rez·əv¸wär }

chemical resistance [MATER] Ability of solid materials to resist damage by chemical reactivity or solvent action. { 'kem·i·kəl ri'zis·təns }

chemical rock [PETR] A type of sedimentary rock comprising material deposited directly by precipitation from solution or colloidal suspension and frequently possessing a crystalline texture. { 'kem·i·kəl 'räk }

chemical sense [NEURO] A process of the nervous system for reception of and response to chemical stimulation by excitation of specialized receptors. { 'kem·i·kəl 'sens }

chemical shift [PHYS CHEM] Shift in a nuclear magnetic-resonance spectrum resulting from diamagnetic shielding of the nuclei by the surrounding electrons. { 'kem·i·kəl 'shift }

chemical shim [NUCLEO] A chemical, usually boric acid, that is placed in the coolant system of a nuclear reactor to serve as a neutron absorber and that compensates for fuel burnup during normal operation. { 'kem·i·kəl 'shim }

chemical shutdown [NUCLEO] Addition of a dissolved poison to the coolant of a nuclear reactor to achieve shutdown. { 'kem·i·kəl 'shət¸daůn }

chemical similitude [CHEM ENG] A procedure used to ensure satisfactory operation of a full-scale chemical process by comparison with pilot plant data. { 'kem·i·kəl sə'mil·ə¸tüd }

chemical species *See* species. { 'kem·i·kəl 'spē¸shēz }

chemical spray [ORD] Aerial release, or device for aerial release, of liquid war gas for casualty effect, or of liquid smoke for aerial smoke screens. { 'kem·i·kəl 'sprā }

chemical sterilization [ENG] The use of bactericidal chemicals to sterilize solutions, air, or solid surfaces. { 'kem·i·kəl ¸ster·ə·lə'zā·shən }

chemical stoneware [MATER] Clay pottery material that resists acids and alkalies; used for ball mills, pipes, laboratory sinks and utensils, and so on. { 'kem·i·kəl 'stōn¸wer }

chemical symbol [CHEM] A notation for one of the chemical elements, consisting of letters; for example Ne, O, C, and Na represent neon, oxygen, carbon, and sodium. { 'kem·i·kəl 'sim·bəl }

chemical synthesis [CHEM] The formation of one chemical compound from another. { 'kem·i·kəl 'sin·thə·səs }

chemical tanker [NAV ARCH] Ship designed with tanks of stainless steel, or of other materials, capable of containing chemicals. { 'kem·i·kəl 'taŋ·kər }

chemical thermodynamics [PHYS CHEM] The application of thermodynamic principles to problems of chemical interest. { 'kem·i·kəl ¸thər·mō·də'nam·iks }

chemical thermometer [ENG] A filled-system temperature-measurement device in which gas or liquid enclosed within the device responds to heat by a volume change (rising or falling of mercury column) or by a pressure change (opening or closing of spiral coil). { 'kem·i·kəl thər'mäm·əd·ər }

chemical tracer [NUCLEO] A tracer having chemical properties similar to those of the substance with which it is mixed. { 'kem·i·kəl 'trā·sər }

chemical vapor deposition [SOLID STATE] The growth of thin solid films on a crystalline substrate as the result of thermochemical vapor-phase reactions. Abbreviated CVD. { 'kem·i·kəl ¦vā·pər ¸dep·ə'zish·ən }

chemical warfare [ORD] Originally, the employment of poison gases as antipersonnel agents; later expanded to include flame and incendiary warfare, smoke for screening or signaling purposes, and microorganisms (bacteria and their toxins, rickettsia, viruses) for the production of casualties or destruction of crops. Also known as chemical operations. { 'kem·i·kəl 'wȯr¸fer }

chemical weathering [GEOCHEM] A weathering process whereby rocks and minerals are transformed into new, fairly stable chemical combinations by such chemical reactions as hydrolysis, oxidation, ion exchange, and solution. Also known as decay; decomposition. { 'kem·i·kəl 'weth·ə·riŋ }

chemiclearance [CHEM] The use of chemical analysis to establish the safe use of a substance. { 'kem·i¸klir·əns }

chemiflux *See* chemical flux. { 'kem·ə¸fləks }

chemi-ionization [CHEM] Ionization that occurs as a result of the collison of a particle with a neutral species, usually excited, such as a metastable atom. { ¸kem·ē¸ī·ə·nə'zā·shən }

chemiluminescence [PHYS CHEM] Emission of light as a result of a chemical reaction without an apparent change in temperature. { ¸kem·i¸lüm·ə'nes·əns }

chemimechanical pulp [MATER] Plant material treated by the sulfite, soda, or sulfate process for papermaking. { ¦kem·i·mə¦kan·i·kəl 'pəlp }

chemionics [CHEM] The chemistry of molecular components and devices that operate on photons, electrons, and ions. { ¸kem·ē'än·iks }

chemiosmosis [CHEM] A chemical reaction occurring through an intervening semipermeable membrane. Also known as chemosmosis. { ¦kem·ē¸äs¦mō·səs }

chemiosmotic coupling [BIOCHEM] The mechanism by which adenosinediphosphate is phosphorylated to adenosinetriphosphate in mitochondria and chloroplasts. { ¦kem·ē¸äs¦mäd·ik 'kəp·liŋ }

chemisorption [PHYS CHEM] A chemical adsorption process in which weak chemical bonds are formed between gas or liquid molecules and a solid surface. { 'kem·i¸sȯrp·shən }

chemist [CHEM] A scientist specializing in chemistry. { 'kem·əst }

chemistry [SCI TECH] The scientific study of the properties, composition, and structure of matter, the changes in structure and composition of matter, and accompanying energy changes. { 'kem·ə·strē }

chemoautotroph [MICROBIO] Any of a number of autotrophic bacteria and protozoans which do not carry out photosynthesis. { ¸kē·mō¸ȯd·ə'träf·ik }

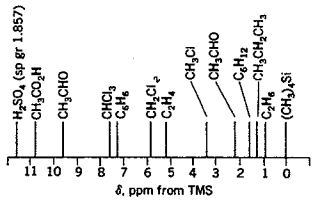
chemocline [HYD] The transition in a meromictic lake between the mixolimnion layer (at the top) and the monimolimnion layer (at the bottom). { 'kē·mə¸klīn }

chemodectoma [MED] A benign tumor of the carotid body. { ¦kē·mō¸dek'tō·mə }

chemodifferentiation [EMBRYO] The process of cellular differentiation at the molecular level by which embryonic cells become specialized as tissues and organs. { ¦kē·mō¸dif·ə¸ren·chē'ā·shən }

chemoheterotroph [BIOL] An organism that derives energy

CHEMICAL SHIFT



Chemical shifts for representative compounds. Decreasing values of δ correspond to increasing magnetic field in a constant-frequency spectrometer. The scale calibration is obtained from the resonance signal of a small amount of tetramethylsilane (TMS) placed in the sample tube to provide a zero reference point.